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Social Skills Training and Generalization of Skills in Children with Autism Spectrum Disorder

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Honors College Thesis: Social Skills Training and Generalization of Skills in Children with Autism Spectrum Disorder

by

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Abstract

The social deficits observed in individiuals with autism spectrum disorder (ASD) can often be improved with social skills training. The current study evaluated the effects of the Superheroes Social Skills training program which uses animated superheroes, video modeling, and comic books to teach social skills training. Three participants with ASD were trained in *Conversation, Responding to Questions,* and *Body Basics* over ten sessions, with sessions occurring twice a week in a non-school setting at the Arc of Southeast Mississippi. A multiple baseline across skills design across participants was used to examine the effects of the intervention on skill accuracy across both training and generalization probes. All participants demostrated improvements in skill accuracy for the training probes and two of the participants demonstrated improvements in skill accuracy in the generalization probes.

Keywords: Autism Spectrum Disorder, social skills training, children, non-school setting

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List of Abbreviations

ABA	Applied Behavioral Analysis
APA	American Psychological Association
ASD	Autism Spectrum Disorder
ASRS	Autism Spectrum Rating Scales
ASSP	Autism Social Skills Profile
BB	Body Basics
BCT	Baseline Corrective Tau
BL	Baseline
CON	Conversation
CURP	Child Usage Rating Profile
DTT	Discrete Trial Training
INT	Intervention
IOA	Interobserver Agreement
MT	Maintenance
RQ	Responding to Questions
SHSS	Superheroes Social Skills
URP	Usage Rating Profile

Chapter 1: Introduction and Literature Review

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder in which individuals express repetitive behaviors and social communication deficits (American Psychiatric Association [APA], 2013). To address the social communication deficits associated with ASD, many researchers have used social skills training to improve individuals' social skills. Social skills traning can be delievered via different formats, including discrete trial training, behavioral skills training, and video modeling. Generalization of social skills is also often examined as indivudials' use of newly learned skills in a setting other than the training setting is a very important component of any social skills program.

Discrete Trial Training

In the past, discrete trial training (DTT) has primarily been used to teach new behaviors and discriminations, such as imitation and verbal language skills (Smith, 2001). It is a one-on-one, trainer-participant intervention. A discrete trial contains five parts: a cue, a prompt to assist the participant in their response, a response from the participant, a consequence (e.g., reinforcement if the participant responds correctly or nothing if they respond incorrectly), and a 1-5 second intertrial interval delay between trials. Discrete trials are short to provide ample opportunities for learning and have clear beginning and ending.

While DTT is effective, it is only a part of most applied behavioral analysis (ABA) treatment (Smith, 2001), it has limitations such as participants not initiating behaviors when cues are ambiguous and lack of generalization of skills. Therefore, DTT is often used in conjunction with other elements, such as videos and peer models, to

enhance the effects of the training. Matson, Benavidez, Compton, Paclawskyj, and Baglio (1996) found that DTT in conjunction with incidental teaching, in which the person implementing the training reacts to the participant's actions, is also beneficial.

Superheroes Social Skills Training Program

Superheroes Social Skills (SHSS) training program has gained support as a multicomponent method to teach social skills (O'Handley, Ford, Radley, Helbig, Wimberly, 2016; Radley, Ford, Battaglia, & McHugh, 2014; Radley, Hanglein, & Arak, 2016; Radley, O'Handley, Ness, Ford, Battaglia, McHugh, & McLemore, 2014). This program addresses many of the problems that arise when using DTT independently, by incorporating video models, skill rehearsal, and generalization components. According to Jenson, Bowen, Clark, Block, Gabrielsen, Hood, and Springer (2011) the SHSS training program, is a manualized program that incorporates DTT along with video modeling and animated superheroes to administer instruction and rehearsal of target skills.

Social skills training can be administered to anyone with social deficits. Individuals with ASD (Radley et al., 2014; Radley, Hanglein, & Arak, 2016; Radley, et al., 2014), other developmental disabilities, and intellectual disabilities (O'Handley, Ford, Radley, Helbig, Wimberly, 2016) are the primary targets of social skills training research. Social skills training has been conducted in a school setting in an vacant classroom (Radley et al., 2014), library (O'Handley et al., 2016), or school-based office (Radley, Hanglein, & Arak, 2016). Radley et al. (2014), also used a recess setting for generalization purposes. Social skills training can also take place in clinic setting (Radley et al., 2014).

The SHSS program has a total of 18 target skills (Jenson et al., 2011). Often researchers have focused on 3 to 5 of the 18 target skills based on the skills that could use the most improvement for he participant(s). For example, O'Handley et al. (2016) tracked *Expressing Wants and Needs*, *Conversatio*n, and *Turn Taking* whereas Radley, Hanglein, and Arak (2016) used *Introducing Self*, *Get Ready*, *Participate*, and *Body Basics*. However, there have been instances of training more than 5 skills such as in Radley et al. (2014), where they trained *Introduction/Participate, Imitation, Body Basics, Expressing Wants and Needs, Joint Attention, Turn Taking, Responding to Questions and Requests*, and *Conversation/Topic Maintenance* in an eight-week study. The current study targeted three skills: *Conversation, Responding to Questions*, and *Body Basics.*

Generalization

However, training the skills with only the researcher(s) does not indicate the participants will use those skills with other people, in other settings, or in other situations. Therefore, teaching the participants to generalize skills is important. The SHSS program incorporates behavioral rehearsal to promote generalization of the target skills (Jenson et al., 2011). Traning for generalization across people can be done by incorporating typically developing peers (Radley et al., 2014; Radley, Dart, Furlow, & Ness 2014) teachers (O'Handley et al., 2016), or unfamiliar individuals Radley, O'Handley, Ness, Ford, Battaglia, McHugh, & McLemore (2014). The current study used one of the lead after-school teachers from the Arc of Southeast Mississippi to administer generalization probes.

Purpose

The purpose of this study was to incoperate social skills training in a non-school setting, which to the reseracher's knowledge, has not been done before. Social skills training is typically conducted in a school or clinic setting, the current study deviated from this by administering the social skills training at the Arc of Southeast Mississippi. This is a novel setting for social skills training. The current study was guided by the following questions:

1. What is the effect of participation on social skill accuracy for the training probes?
2. What is the effect of participation on social skill accuracy for the generalization probes?

Chapter 2: Methodology

Participants and Setting

Three children with a special education classification of Autism were selected for this study. The primary researcher consulted with the directors of the Arc of Southeast Mississippi to identify potential participants who might benefit from social skills training and were not already receiving school-based services targeting social functioning. Research began after obtaining approval from the Institutional Review Board (IRB; Appendix A and Appendix B). Parental consent was also gathered for each participant (Appendix C).

Three researchers were involved in the current study. The primary researcher was an undergraduate honor student was accompanied by two supervising graduate students from the school psychology doctoral program. One of the graduate students acted as the

group leader for all of the sessions except one time when they were absent in which the other graduate student lead the group.

The three participants consisted of: Jill, (12), caucasion female; Jake, (8), African American male; and Tom, (9), causcasion male. All three participants attended the Arc of Southeast Mississippi's summer daycare program as well as the after-school program. Skills were selected based on the results of the Autism Social Skills Profile (ASSP). Originally the primary reseracher intended to include lag scedules of reinforcement, which would have required participants to provide varying responses, therefore some skills were chosen for that purpose. The lag portion of the intervention was excluded because participants struggled to perform the skills in general. There was also a time constrant in the study that would not have been suitable for lag. Given both of these reasons, the target skills were then altered. The original target skills included: *Turn Taking*, *Conversation*, and *Participate*. *Turn Taking* and *Participate* are advanced skills and therefore would have been more difficult to train properly, given the students' pre-intervention skill levels, so they were excluded. *Body Basics* and *Responding to Questions* were added as a foundational skill in place of *Participate* and *Turn Taking*. All changes to the skills targeted aligned with the results of the ASSPs.

Social skills training took place in a private room at an Arc of Southeast Mississippi in the Southern region of the United States. Both training and generalization probes were administered in the same setting. The intervention occurred in a group setting, but probes were presented to the participants individually. Sessions took place twice a week, except for the first three sessions which were once a week, for one hour

each. There were a total of ten sessions. If a participant was absent from a session, they did not receive a makeup session.

Materials and Measures

Superheroes Social Skills Training Kit. This study required a laptop and an SHSS training kit. The SHSS program utilizes video modeling, as well as videos of animated superheroes, to teach 18 target skills (Jenson et al., 2016). Although there are 18 possible target skills, only three were utilized in this study: *Body Basics*, *Conversation,* and *Responding to Questions*. Therefore, the materials used were those essential to the three target skills. Specifically, the materials used included items specific to each skill to aid in training such as the video models, comic books, and power charge cards. The general materials (e.g., materials that can be used for all 18 skills of the program that are not specific to any one skill) that were used included scooter cards (i.e., cards received for following the group rules and behaving well), blackhole cards (i.e., cards received for being disruptive and behaving poorly), and the prize spinner (i.e., a tool designed to determine which reward [e.g., various snack size candies] was given).

Data Sheets. The data sheets were developed from the task analyses of the SHSS program. The data sheets consist of the steps from the task analyses to be followed for each skill (See Appendix D). The rows of the data sheet identified the individual probes. The columns identified the date, phase (e.g., baseline, training, or maintenance), generalization, percentage correct (e.g., percentage of steps followed) and IOA (e.g., the percentage of steps agreed to be followed by the independent observer and the secondary observer). There were also columns for each discrete step for the target skill. If a step was followed a checkmark was placed in the box, if a step was not followed the box was

either left blank or marked with an x. Each skill (e.g., *Conversation, Responding to Questions,* and *Body Basics*) had their own specific steps to be followed and these were indicated in the data sheets.

Each skill had a specific set of discrete steps, although some of the steps were similar. The steps for *Conversation* included: face the person (i.e., orient head and shoulders toward the person), make eye contact within 5s and maintain for 3s, say something about a topic, listen to the other person's response (i.e., maintain eye contact and orientation) and make a relevant comment. In the case of *Responding to Questions* the steps were: face the person (i.e., orient head and shoulders toward the person), make eye contact within 5s and maintain for 3s, listen to the other person's question (i.e., maintain eye contact and orientation), respond within 10s, and respond with an appropriate answer. Lastly, for *Body Basics* was the acronym FEVER was used to remember the steps. FEVER stands for: face, eye contact, volume, expression, and relax. The discrete steps for FEVER consisted of: face the person (i.e., orient head and shoulders toward the person), make eye contact within 5s and maintain for 3s, appropriate voice (i.e., volume is not too loud or too quiet), appropriate expression (i.e., matches conversation), and posture (i.e., relaxed).

Procedural Checklist. The procedural checklist from the SHSS program (See Appendix E) was utalized. It consists of steps to be followed throughout each session to ensure that the procedure is the same across sessions. The steps consist of: Free Play, Probe Baseline Skills, Probe Maintanence Skills, Review Daily Schedule and Group Rules, Introduce Skill and Provide Rationale, List Discrete Steps, Distribute Power Charge Cards, Play Fast Hands and Peer Model Video, Inaccurate and Accurate Skill

Demonstration, Role Play with Participants to 100% Accuracy, Distribute Comic Book, Play Comic Video, Play Social Game, Free Time and Collect Probes of Target Skill, Draw from Scooter/Black Hole Cards, and Use Spinner and Distribute Rewards.

Free Play. This involved the participants choosing toys from the toy room at the Arc. No probes or prompts were administered at this time. Free play was approximately 15 minutes in duration.

Probe Baseline Skills. This step required all three the researchers to administer prompts to determine how well the participants perform the skills immediately before training. This step spanned approximatly 5 minutes. Prompts were delivered by one researcher to one participant while participants were still engaged in play. This is done for the skills that had not been trained yet, therefore if a skills was being trained or was in maintenance, baseline probes were not collected for those skills. If no maintenance probes were gathered, toys were collected and set aside after this step and the lesson would begin.

Probe Maintenance Skills. This step did not begin until training for a skill was complete and a new skill began training. Therefore, maintenance probes for *Conversation* were not administered until training for *Responding to Questions* began, maintenance probes for *Responding to Questions* were administered after training for *Body Basics* began, and maintenance probes for *Body Basics* were administered when training for it was complete. Maintenance probes were collected after baseline probes if baseline probes were collected. This extends for approximately 5 minutes. This step evaluated the participants ability to continue using the skill when they were no longer being trained. As in Probe Baseline Skills, one researcher probed maintenance skills with

one child while they were still engaged in play. Toys were collected after this step and set aside to prevent distraction and the lesson would begin.

Review the Daily Schedule and Group Rules. Reviewing the daily schedule involved telling participants what skill was being trained that day, whether it was reviewing the skill from the previous session or moving onto a new skill. This was executed by the researcher who acted as the group leader of the session. The group rules were: Be cool (e.g., stay calm, don't yell), Get ready (e.g., hands in lap or table, feet on floor, eyes on group leader) follow directions (e.g., the first time you are asked) and participate (e.g., do what the group is doing).

Introduce Skill and Provide Rationale. This step provides instruction about the skill for the day is and why it is important. The rationale is outlined in the SHSS Manual for each skill. This was also completed by the group leader by reading from a specific script for each skill, in language that is easy for children to understand.

List Discrete Steps. These steps were unique to the skill that is being trained. These steps were also outlined in the data sheets and task analyses of the SHSS manual. This was also accomplished by the group leader.

Distribute Power Charge Cards. These were cards that list out the discrete steps, so that the participants were able to read the steps to help them remember. The cards also had bubbles that the participants filled in when they correctly demonstrated the target skill.

Play Fast Hands and Peer Model Video. These videos were used to depict how other people look when they utilize the skill. Videos were approximately 3 minutes in

length. These videos depict other children modeling the target skills in real life situations.

Inaccurate and Accurate Skill Demonstrations. This is simply the two of the researchers performing a role-play and acting out the skill with each other. The inaccurate demonstration was performed first and was exaggerated so that the participants had a chance to point out the steps that were missed. Then the researcher was given another opportunity to demonstrate the skill accurately after receiving feedback from the participants on what the researcher could do to improve the skill and perform an accurate demonstration. This step spans approximately 3 minutes.

Role Play with Participants to 100% Accuracy. This was another way for the participants to practice the target skills without recording data. In this step, the participants had the opportunity to fill in the bubbles on their power charge cards. If a participant was able to accurately display the skill, they filled in a bubble on the power charge card. If a participant did not accurately demonstrate the skill, they were given another opportunity. Participants could only fill in a bubble for accurate displays of the target skill. This step lasted approximately 5 minutes.

Distribute Comic Book and Play Comic Video. These two steps go together because the comic books follow along with the videos. Videos were approximately 3 minutes in length. These videos and their cooresponding comic books depict animated superheroes displaying the target skills and explaining the discrete steps of the skills. These were different videos than the peer video models, which depict other children demonstrating the target skills. The videos and comic books are a different method of demonstrating the steps of the target skills to the participants.

Play Social Game. The social games help the participants use the skills. The games were different for each skill. The social game for *Conversation* was a story telling game. The group leader began a silly story and the participants would go one-by-one and add to the story. The game played during *Responding to Questions* was Twenty Questions. Twenty Questions was played with one researcher and one participant and questions were asked and answered by both the researcher and participant. The game played for *Body Basics* was rock, paper, scissors. During rock, paper, scissors one researcher would play with one participant to see who could win the most games. This requires approximately 5 minutes.

Free Time and Collect Probes of Target Skill . The participants were able to retrieve thier toys again and engage in free play. While they played, the prompts were presented by the researchers for the training probes (i.e., one researcher would present probes to one participant). After the researchers completed their data collection, the lead after-school teacher would administer the generalization probes. This step extends for approximately 15 minutes.

Draw from Scooter/Blackhole Cards. Scooter cards were given when a participant followed groups rules while blackhole cards were given when groups rules were broken. Scooter cards and blackhole cards were collected throughout the session. All of the cards were collected in a bucket and one was picked at random by one of the researchers to determine if the spinner would be used. If a scooter card was pulled then the participants were able to use the spinner to determine what kind of candy they would get, but if a blackhole card was pulled the session would end and they would not receive a reward. Only one card is pulled to determine if all three participants receive a reward.

Use Spinner and Distribute Rewards. If a scooter card was pulled from the bucket, participants were able to spin the spinner. The spinner had different sections of different colors. Each color had a corresponding snack size candy. The spinner was only spun once, if it was spun at all, meaning all participants received the same candy.

Dependent Variables

Skill Accuracy in Training Probes. The primary dependent variable was skill accuracy in training probes. Accuracy was measured using the task analysis to calculate percentage of steps followed. Responses were coded in accordance to the task analysis for the skill in the SHSS manual as percentage of steps followed (Jenson et al., 2017). Percentage of steps followed was calculated by taking the number of steps accurately followed from the task analysis and dividing them by the total number of steps of the task analysis and multiplying by 100 to convert into a percentage. Each task analysis includes four to five discrete steps that were specific for each skill. The steps were essential for demonstrating each target social skill accurately. Task analyses were located in the data sheets for each skill (See Appendix D).

For the training probes, data was collected in response to researcher-delivered prompts of skill use (See Table 1). There was only one prompt each for Conversation and Responding to Questions. However, for Body Basics the prompt could have been anything other than "Hey (participant name) how was your day?" which was the prompt for Responding to Questions.

Skill Accuracy in Generalization Probes. The secondary dependent variable was skill accuracy for the generalization probes. Accuracy for the generalization probes was measured the same room as for the training probes. Although for the generalization

probes, the lead after-school teacher from the Arc of Southeast Mississippi presented probes for all three skills. The prompts used in generalization were the same as the training prompts (See Table 1). The number of discrete steps was recorded using the same data sheets with the task analyses and calculated the same as in training.

Social Functioning

Autism Social Skills Profile. To analyze social functioning, the Autism Social Skills Profile (ASSP; Bellini, 2006) was administered as a Pre-Post measure. The ASSP was completed by the director of the Arc's daycare for all participants prior to and following the interverntion. The ASSP evaluates an individual's total social functioning score. The ASSP is comprised of 49 items and is measured on a four-point Likert scale, where a score of 1 indicates the participant "Very Rarely" performs a behavior and a score of 4 implies the participant "Very Often" engages in a behavior. It has three subscales: Social Reciprocity, Detrimental Social Behaviors, and Participation/Avoidance.

In terms of validity, Bellini and Hopf (2007) regularly edited the items used in the ASSP. The ASSP was also inspected by ten experts from the Indiana Resource Center for Autism and other organizations. The experts were asked to: indicate if the items accurately resemble social characteristics of ASD, verify that the items were clear, make suggestions for improvements of the current items, and offer suggestions for new items. Appropriate alterations were made afterwards. Internal consistency was high ($\alpha = .94$).

Bellini and Hopf (2007) tested the reliability of the ASSP using Cronbach's alpha. The researchers used two samples: a high functioning sample and a mental retardation or severe language deficits sample. Reliability was calculated for both groups individually

and in total. Reliability was high for all groups. The total sample had a reliability of .926 and increased to .929 after removal of two items that had low correlations. The high functioning sample had .940 reliability. Finally, the mental retardation sample was at .848, after the removal of four low correlating items it increased to .864.

Bellini and Hopft also examined the test-retest reliability of the ASSP. They did this by sending having caregivers complete the ASSP again within a week or within three weeks. Test-retest reliability was high for all groups as well. It was at .904 for the total sample. Test-retest reliability for the high-functioning sample was .902. Finally, the mental retardation or severe language deficits sample was .878 for test-retest reliability.

Social Validity

Children's Usage Rating Profile. To test social validity the Children's Usage Rating Profile (Actual; CURP) was used (Briesch & Chafouleas, 2009; Appendix G). The CURP was administered to two of the three participants. Tom did not complete the CURP. Due to Tom's level of functioning, the researchers believed that he would not be able to understand and respond to the presented questions properly, therefore the results would not have been valid. The CURP consists of 21 items and is measured on a four-point Likert scale, where 1 implies that the child "Totally Disagrees" with the statement and 4 indicated that the child "Totally Agrees" with the statement. The CURP has three subscales: personal desirability, feasibility, and understanding.

Briesch and Chafouleas (2009), tested validity of the CURP in two phases. In the qualitative stage face validity was evaluated. This was done by education specialists and fourth-grade students. No items were excluded in this phase, but six items were reworded for clarity. The second phase was a quantitative stage, experts assessed the

content. The researchers were to analyze the items and determine which category they thought the item belonged to, how confident they were that the item belonged in that category and how pertinent the items were to the category. After this, items were flagged for review if: a) they were considered to be a part of three or more categories, b) more than one expert was unsure of the category an item should be put in, or c) if multiple experts considered an item irrelevant to the category. The majority of these items were deleted.

To calculate reliability, Briesch and Chafouleas (2009) used Cronbach's alpha for each subscale. Inter-item correlations were measured prior to reliability coefficients and no items were deleted for this. Subscale I (Personal Desirability), consisted of nine items that indicated if the student enjoyed the intervention and would participate again. Personal Desirability had a reliability alpha of .92. Subscale II (Feasibility), was included eight items that determined if the participant felt that intervention was too strenuous or not and if it interfered with class. Reliability for Feasibility was high (α = .82). Lastly, Subscale III (Understanding) contained six items that assessed if the participant understood why the intervention was used and if they believed they could utilize the intervention. Understanding had an acceptable reliability (α = .75).

Usage Rating Profile. The Usage Rating Profile-Intervention (Revised; URP-IR) was also used (Chafouleas, Briesch, Neugebauer, & Riley, 2011; Appendix H). The URP-IR was completed by the lead after-school teacher, who delivered the generalization prompts, to judge if they believed that the research performed was useful. It consists of 29 items measured on a six-point Likert scale, where a score of 1 signifies that the person "Strongly Disagrees" with the statement and a score of 6 conveys that the person

"Strongly Agrees" with the statement. The URP-IR evaluates six subscales: acceptability, understanding, home school collaboration, feasibility, system climate, and system support.

Briesch, Chafouleas, Neugebauer, and Riley-Tillman (2013), tested the validity of the URP-IR in many steps. Firstly, the researchers investigated the correlation matrices to determine if exploratory factor analysis was apt. No items were excluded, therefore exploratory factor analysis was used. After this, parallel analysis, scree plot, and interpretability was investigated. Through scree plot and parallel analysis, a disparity was found, resulting in three factors being eliminated. Next, the remaining 40 items underwent principal axis factoring with an oblique rotation. The common variance was found to be 40% between items. Subsequently, dimensionality of the items was inspected using the pattern coefficient matrix. An adequate pattern coefficient is considered to be .45, thus the twelve items that fell below .45 were excluded. The items were then inspected for multidimensionality, but none was found. Finally, the factor correlation matrix showed factor correlations between .42 and .47, suggesting there was discriminant validity.

Reliability of the URP-IR was also evaluated by Briesch, Chafouleas, Neugebauer, and Riley-Tillman (2013), for each subscale using Cronbach's alpha. Reliability was deemed acceptable reliability if it had an alpha that was greater than or equal to .70. Subscale I (Acceptability) includes nine items that evaluate if the participant found the intervention acceptable and how likely they were to use the intervention. Acceptability had a high of reliability of .95. Subscale II (Understanding) is comprised of three items that estimated the participants level of understanding of the

intervention. The reliability for Understanding was sufficient at .79. Subscale III (Family-School Collaboration) consists of three items that evaluate whether the participant believed that family-school collaboration is needed. Family-School Collaboration had a satisfactory reliability of .78. Subscale IV (Feasibility) includes six items that determine if the participant believed the intervention was reasonable. There was a high reliability for Feasibility as well with an alpha of .88. Subscale V (System Climate) incorporates five items that assess if the intervention would correspond with a school setting. Finally, Subscale VI (System Support) is made up of three items that evaluate whether the participant thought it was necessary for other adult aid for intervention to be successful. System Support has a reliability lower than acceptable with an alpha of .67, although Briesch et al. (2013) believe this could be due to the limited number of items for this scale.

Experimental Design and Data Analysis

A multiple baseline across skills design across-participants for three participants was used to evaluate the effectiveness of the intervention. Three experimental conditions were evaluated as part of this study: baseline, training, and maintenance. For each participant, across all three skills and all three phases (i.e., baseline, training, and maintenance), the percent of steps followed accurately for the task analysis was recorded. This design allows for the functional relationship between the independent variable and dependent variables to be examined by staggering the independent variable across different points in time. The baseline and training phases consisted of at least five data points across all skills for each participant for the training probes. For the generalization probes of the intervention, a minimum of two - typically three - data points were

collected for all participants across all skills in baseline and training. The maintenance phase was the only exception to the data point minimums due to a time constraint in both training and generalization probes. For maintenance the same number of probes were collected for both training and generalization. In *Conversation* three maintenance probes were collected, two for *Responding to Questions*, and a single probe was acquired for *Body Basics*.

Visual analysis was used as the primary analysis of the data. This was used to assess the functional relationship between the independent variable and the dependent variables by looking at the levels, trends, and variability of data points representing skill accuracy. Furthermore, baseline corrected tau (BCT) was be used to evaluate effect sizes.

Procedure

Baseline. During the baseline phase, the participants responded to prompts without any intervention or training. Data collection occurred for both training and generalization probes. Five probes were presented for each skill in the training condition and three probes were presented for the generalization probes.

Training. In this phase, the participants were introduced to the SHSS training program. The intervention proceeded in accordance with the manualized intervention by following the steps outlined in the procedural checklist (Jenson et al., 2011).

After training, training probes were presented. Three to six probes (generally 5) were presented during each session. Mastery of a skill was characterized by the subject achieving 100% skill accuracy on three consecutive probes. If a participant obtained

mastery, they were no longer administered prompts, but continued the session until the end to obtain generalization probes and to receive reinforcement, if the session allowed. .

Scooter cards and blackhole cards were collected throughout the session during the training phase and deposited in a bucket. At the end of the session, a card was pulled from the bucket to determine if the group would receive a prize or reinforcement. The participants received candy at the end of the session if a scooter card was selected from the bucket. If a blackhole card was selected from the bucket at the end of the session, the group did not receive candy that day.

Maintenance. After two sessions of training a skill, it was time to train a new skill, and previous skills were moved to the maintenance phase. In *Conversation* three maintenance probes were gathered, while two for *Responding to Questions*, and only one probe was collected for *Body Basics*, all for both training and generalization.

Interobserver Agreement

To ensure accurate data, a secondary observer was present at least 20% of probes per phase for each participant to independently record skill accuracy data. Interobserver agreement (IOA) was calculated by dividing the agreements between the observers on the number of discrete steps followed by the total number of agreements and disagreements, multiplied by 100 . IOA was 100% across all sessions for all skills with all participants, except on one occurrence, in which IOA was 80% (see below).

Specifically, in *Conversation*, IOA was calculated for 40% of baseline sessions for all three participants, which resulted in IOA values of 100% for all participants. In the training phase, IOA was calculated for 27% (Jill), 66% (Jack), and 44% (Tom) of sessions, leading to IOA values of 100% for each participant. During maintenance IOA

was collected for 33% of sessions for all three participants, leading to IOA values of 100% for each participant. IOA for *Conversation* for the generalization probes was calculated at 33% across all phases for all participants, resulting in IOA values of 100% across all phases for each participant.

As for *Responding to Questions*, IOA was calculated for 37.5% (Jill), 57% (Jake), and 28.5% (Tom) of baseline sessions, generating IOA values of 100% across each participant. Next, during training, IOA was calculated for 40% (Jill), 28% (Jake), and 28.5% (Tom) of sessions, leading to IOA values of 100% for each participant. During maintenance IOA was collected for 50% of sessions for all three participants, leading to IOA values of 100% for each participant. In the case of generalization, IOA was calculated at 66% (Jill), 33% (Jake), and 50% (Tom) of sessions in baseline, resulting in IOA values of 100% for all participants. Concerning training sessions, IOA was collected for 33% of session for each participant, resulting in IOA values of 100% for all participants. Furthermore, IOA in the generalization probes during maintenance was collected at 50% of sessions for all participants, resulting in IOA values of 100% for all participants.

Finally, in the case of *Body Basics*, IOA for baseline was calculated for 42% (Jill), 33% (Jake), and 25% (Tom) of sessions, which resulted in IOA values of 100%, 96%, and 100% respectively. In the training phase, IOA was calculated for 40% (Jill), 20% (Jack), and 40% (Tom) of sessions, leading to IOA values of 100% for each participant. During maintenance IOA was collected for 100% (Jill), % (Jake), and 100% (Tom) of sessions, leading to IOA values of 100% for each participant. In the case of the generalization probes, IOA was calculated at 33% (Jill), 40% (Jake), and 40% (Tom) of

sessions in baseline, resulting in IOA values of 100% for all participants. During training, IOA was gathered at 33% (Jill), 33% (Jake), and 33% (Tom) of session, resulting in IOA values of 100% for all participants. Finally, IOA during maintenance was retrieved at 100% (Jill), % (Jake), and 100% (Tom) of sessions, resulting in IOA values of 100% for all participants.

Procedural Integrity

Procedural integrity was assessed via a procedural integrity checklist to examine implementation of the steps within the intervention (Jenson et al., 2011; Appendix E). Procedural integrity was gathered for 100% of sessions throughout the study. IOA was calculated by dividing the number of discrete steps that both the implementer and the secondary independent observer agreed were followed by the total number of discrete steps then multiplied by 100. Procedural integrity resulted in 100% IOA for every session.

Chapter 3: Results

Visual Analysis

Jill. For *Conversation* (labeled as CON in figures), Jill's performance during baseline in training reflected a high level then had a variable trend (M = 64%, range = 20%-100%; Figure 1). During training, she demonstrated a high level but had a decreasing trend that eventually increased and remained high (M = 85.5%, range = 40%-100%). Finally, during maintenance, she achieved a high level, which had a stable trend (M = 100%).

Regarding the generalization setting of *Conversation*, during baseline, her performance displayed a moderate level and had an increasing trend (M = 66.6%, range =

60%-80%). Duirng the training phase, she demonstrated a lower level than in baseline then had an increasing trend until it leveled out to a stable trend (*M* = 46.6%, range = 0%-100%). Finally, during the maintenance phase, she showed a high level and had a stable trend (*M* = 100%).

As for *Responding to Questions* (labeled as RQ in figures), during baseline for the training probes her performance demonstrated a moderate-to-low level and had an increasing trend. Then had a slight decreasing trend, that then increased to a high level. At the end of baseline training, she had an increasing trend, which leveled off into a stable trend at a high level (*M* = 50%, range = 25%-100%). In the training phase, she displayed a high level, had a decreasing trend that eventually increased, then finally ended at a high level with a stable trend (*M* = 80%, range = 0%-100%). In maintenance, she was at a high level and had a stable trend (*M* = 100%).

Concerning the generalization probes for *Responding to Questions*, Jill's performance displayed a moderate-to-high level during baseline which had a decreasing trend, that increased back to a moderate to high level (*M* = 58.3%, range = 25%-75%). In the training phase, she showed a high level and had a stable trend (*M* = 100%). Finally, for maintenance, she performed at a moderate-to-high level but had a decreasing trend and ended at a moderate-to-low level (*M* = 50%, range = 25%-75%).

Regarding the training probes for *Body Basics* (labeled as BB in figures), Jill's performance at baseline reflected a high level and had a great deal of variability but ended at a high level (*M* = 74.2%, range = 20%-100%). During training, she showed a high level and had a decreasing trend, then had an increasing trend and ended at a high

level (*M* = 92%, range = 60%-100%). For maintenance, only one probe was presented. Jill's performance was at a high level for the single probe (*M* = 100%).

Referring to the generalization probes for *Body Basics* , Jill's performance displayed moderate level at baseline and had an increasing trend and ended at a moderate-to-high level (*M* = 66.6%, range = 60%-80%). For training, she performed at a moderate-to-high level and had a stable trend (*M* = 80%). Again, only one probe was presented during maintenance but was at a high level (100% of steps followed).

Jake. For the training probes for *Conversation*, Jake performed at a low level and had a stable trend at baseline (*M* = 0%; Figure 2). Moving into training, he displayed a low level but had an increasing trend. Then he remained at a moderate level and had a decreasing trend. Finally, he had an increasing trend and ended at a high level with a stable trend (*M* = 51.1%, range = 0%-100%). In maintenance, he demonstrated a moderate level and had an increasing trend to a high level (*M* = 73.3%, range = 40%-100%).

Relating to the generalization probes for *Conversation*, Jake's performance at baseline reflected at a low level and had an increasing trend to a moderate level (*M* = 26%, range = 0%-40%). At training, he displayed a low level and had a stable trend (*M* = 0%). Then in maintenance, he showed a moderate-to-high level, had an increasing trend to a high level, then had a decreasing trend to a moderate-to-high level (*M* = 80%, range = 60%-100%).

For the training probes for *Responding to Question* , Jake's performance demonstrated a moderate-to-low level at baseline and variable trends throughout the phase and ended baseline at a low level (*M* = 25%, range = 0%-75%). During training,

he showed a moderate-to-high level and had an increasing trend to a high level. Then had a slight decreasing trend to a moderate-to high level. Finally, he had an increasing trend to a high level then had a stable trend (*M* = 89.2%, range = 75%-100%). In maintenance, he had a high level and a stable trend (*M* = 100%).

For the generalization probes of *Responding to Questions*, at baseline Jake's performance reflected a moderate-to-low level and had a stable trend (*M* = 25%). In training, he showed a high level and had a stable trend (*M* = 100%). He displayed a high level and had a stable trend during maintenance as well (*M* = 100%).

Moving into the training probes for *Body Basics* , Jake performed at a moderate level and had some variability in his trends and ended at a moderate level (*M* = 62.2%, range = 40%-100%). During training, he achieved a moderate-to high level and had a slight decreasing trend to a moderate level. Then had an increasing trend to a high level. He had another decreasing tend to a moderate level. Finally, he had an increasing trend to a moderate-to-high level then had a stable trend (*M* = 78%, range = 60%-100%). The single probe taken during maintenance was at a high level (*M* = 100%).

Concerning the generalization probes of *Body Basics*, Jake reflected a moderate-to-low level during baseline and had no tend, then had an increasing trend to a moderate level that ended with a stable trend (*M* = 48%, range = 40%-60%). During training, he showed a moderate to high level, had a decreasing trend to a moderate level then had a stable trend (*M* = 66.6%, range = 60%-80%). The individual maintenance probe taken was at a moderate level (*M* = 80%).

Tom. For the training probes for *Conversation*, Tom's performance at baseline showed a low level, had a great deal of variability and ended at a low level (M = 24%, R

= 0%-80%; Figure 3). For training, he displayed a low level and had a stable trend. Then had an increasing trend to a moderate-to-high level. Then had a decreasing trend to a low level. Finally, he had another increasing trend and ended at a moderate level (M = 26%, R = 0%-80%). In maintenance he demonstrated a moderate-to low level and had a stable trend (M = 20%.

Moreover, in the generalization setting for *Conversation*, Tom performed a moderate level during baseline, had an increasing trend to a moderate-to-high level, then had a decreasing trend and ended moderate level (*M* = 53.3%, range = 40%-80%). For training, he displayed a moderate-to-low level and had an increasing trend to a moderate level, then he had a stable trend and ended at a moderate level (*M* = 33.3%, range = 20%-40%). Finally, in maintenance, he achieved a moderate to high level and had a decreasing trend and ended at a moderate-to-low level (*M* = 46.6%, range = 20%-80%).

For the training probes for *Responding to Questions*, Tom's performance at baseline represented a moderate-to-low level and had an increasing trend to a high level. Then had a decreasing trend to a low level. Finally, he had an increasing trend and ended baseline at a moderate level (*M* = 50%, range = 0%-100%). Moving into training, he achieved a high level and had a decreasing trend to a low level, then had considerable variability but ended at a moderate level (*M* = 38.8%, range = 0%-100%). Finally, in maintenance, he showed a low level and had an increasing trend and ended at a moderate-to-low level (*M* = 12.5%, range = 0%-15%).

As for the generalization setting of *Responding to Questions*, Tom was at a moderate level and had a stable trend during baseline (*M* = 50%). During training, he

displayed a moderate-to-low level and had a stable trend (*M* = 25%). Finally, in maintenance he demonstrated a low level and had a stable trend (*M* = 0%).

Concerning the training probes for *Body Basics*, Tom performed at a moderate level and had a stable trend at the beginning of baseline. Then he had a decreasing trend to a low level. Then an increasing trend to a moderate level and ended with a stable trend (*M* = 57.5%, range = 20%-80%). In training he displayed a high level and had a decreasing trend to a moderate-to-high level and had a stable trend, then he had some variability in trend but ended at a moderate-to high level (*M* = 82%, range = 60%-100%). The one probe presented for maintenance was at a moderate level (*M* = 60%).

Finally, for the generalization setting of *Body Basics*, Tom demonstrated a moderate level at baseline and had a stable trend, then had an increasing trend to a moderate-to-high level and ended with a stable trend (*M* = 68%, range = 60%-80%). For training, he showed a moderate level and had an increasing trend and ended at a high level (*M* = 80%, range = 60%-80%). Lastly, the lone probe for maintenance was at a moderate-to-high level (*M* = 80%).

Effect Sizes.

To calculate effect sizes, the online BCT calculator was used (Tarlow, 2016). Significant improvements were displayed in all participants.

Jill. For the training probes, Jill demonstrated slight improvement. When comparing baseline to training phases during *Conversation*, her data reflected moderate effect (0.595) and a large effect when comparing baseline to maintenance (0.732). For *Responding to Questions*, there was a negative effect when comparing baseline to training (-0.537) and baseline to maintenance (-0.298). Her data also displayed moderate

effects for *Body Basics* when comparing baseline to training (0.278) and baseline to maintenance (0.267).

In the generalization setting, Jill presented some improvement. In *Conversation*, comparing baseline to training, the data revealed a strong effect (0.740). Although, when comparing baseline to maintenance, a negative effect occurred (-0.087). For *Responding to Questions*, when comparing baseline to training the data displayed a very large effect of 0.905, but again the data showed a negative effect when comparing baseline to maintenance (-0.167). In the case of *Body Basics*, the data presented a negative effect when comparing baseline to training (-0.740), but a strong effect when comparing baseline to maintenance (0.775).

Jake. For the training probes exhibited the most progress. On the account of *Conversation*, the data presented a large effect when comparing baseline to training (0.668) and a very large effect when comparing baseline to maintenance (0.913). As for *Responding to Questions*, the data displayed large effects when comparing baseline to training (0.774) and baseline to maintenance (0.707). The data also displayed moderate effects in *Body Basics*, 0.435 when comparing baseline to training and 0.464 when comparing baseline to maintenance.

In relation to the generalization setting he demonstrated some improvement. In *Conversation*, negative effects were found when comparing baseline to training (-0.802) and baseline to maintenance (-0.201). Although, for *Responding to Questions* a very large effect of 1.000 was found when comparing baseline to both training and maintenance. As for *Body Basics*, a negative effect occurred when comparing baseline to

training (-0.244), but a moderate effect was found when comparing baseline to maintenance (0.577).

Tom. For the training probes Tom showed slight improvement. In the case of *Conversation*, he showed small effects when comparing baseline to training (0.073) and baseline to maintenance (0.165). The data for *Responding to Questions* presented negative effects when comparing baseline to both training (-0.454) and maintenance (-0.542). As for *Body Basics*, the data showed a large effect of 0.716 when comparing baseline to training but no effect when comparing baseline to maintenance (0.000).

As for the generalization setting no improvements were made. *Conversation* revealed negative effects of -0.556 when comparing baseline to training and -0.201 when comparing baseline to maintenance. In *Responding to Questions*, a negative effect of -1.000 was found when comparing baseline to both training and maintenance. As for *Body Basics* negative effects were found when comparing baseline to training (-0.439) and baseline to maintenance (-0.346).

Social Functioning

Autism Social Skills Profile. Growth was evaluated through pre- post- ratings for each child that was completed by the director of the Arc of Southeast Mississippi's daycare (Table 1). To compare group data, paired samples *t*-tests were conducted. Although, there were no statistically significant improvements for Total Social Functioning $t(2) = -0.901$, $p = 0.263$, $r = 0.985$, or any of the subscales: Reciprocity $t(2) = -1.131$, $p = 0.375$, $r = 0.925$, Participation/Avoidance $t(2) = -0.971$, $p = 0.434$, $r = 0.994$, Detrimental $t(2) = 0.866$, $p = 0.478$, $r = 0.918$. Improvements were seen in Jake

for Total Social Functioning, Reciprocity (See Figure 4). Significant improvements were not seen for Jill or Tom in any of the subscales (See Figure 4).

Social Validity

Children's Usage Rating Profile. At the end of the study, Jill and Jake completed the CURP to assess the participants' liking of the intervention, if they believed the intervention was feasible, and their understanding of why the intervention and why it was carried out. Tom did not complete the CURP. He was considered to be too low functioning to understand the questions that would have been presented, therefore the results would not have been valid. The mean for Jill was 2.667 and the mean for Jake was 2.810.

Usage Rating Profile. Once the data collection was completed, the lead after-school teacher at the Arc of Southeast Mississippi who participated during the generalization portion of the intervention, completed the URP to determine if they believed the intervention was acceptable, if the participants understood the intervention, if collaboration between the participant's family and the school (in this case the Arc) was necessary, if theinterventoin was feasible, if the intervention was appropriate for the environment, and if they believed they would need assistance in implementing the intervention. The overall mean was 4.83.

Chapter 4: Discussion

Like all studies, this study had limitations that can be addressed in future studies. The first limitation is that the current study was implemented in ten sessions which is a short period of time. This condensed period of time did not allow for optimal skill improvement, but some growth was seen. Additionally, there were certain weeks that the

Arc was closed, thus, we were unable to collect data . There was a break of twelve days between sessions three and four as well as between sessions five and six.

Second, the participants' skill level was not as expected. The intervention was originally meant to include lag scedules of reinforcement but the participants needed more foundational training. Although, there was also a time constraint that also hindered the use of lag. There might have also been miscommunication between the Arc and the primary researcher and skill level might have been confused with intelligence. Tom specifically was very intelligent and could recite the material he learned but usually did not apply what he learned often.

Third, generalized skill use was conducted with a the same person every time and was also someone the participants encountered regularly. It might have been more beneficial to use peers for generalization rather than an adult.

Lastly, the participants might have been reacting to the presence of the researchers during generalization probes. Utializing more discrete methods such as video recording might be beneficial for future studies. It could also be beneficial to train the teachers to take the data themselves so that the researchers can step out while generalization probes can be delivered.

References

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Washington, DC: Author.

Anderson, S. R., Taras, M., & O'Malley-Cannon, B. (1996). How to teach young children with autism. In C. Maurice, G. Green, & S. C. Luce (Eds.), Behavioral interventions in young children with autism: A manual for parents and professionals (pp. 181–194). Austin, TX: PRO-ED.

Bellini, S. (2006). Building social relationships: A systematic approach to teaching social interaction skills to children and adolescents with autism spectrum disorders and other social difficulties. Shawnee Mission, KS: Autism Asperger Publishing.

Bellini, S., & Hopf, A. (2007). The development of the Autism Social Skills Profile: A preliminary analysis of psychometric properties. *Focus on Autism and Other Developmental Disabilities, 22,* 80-87. https://doi-org.lynx.lib.usm.edu/10.1177/10883576070220020801

Briesch, A.M., Chafouleas, S.M., Neugebauer, S.R., & Riley-Tillman, T.C. (2013). Assessing influences on intervention use: Revision of the Usage Rating Profile-Intervention. *Journal of School Psychology, 51,* 81–96.

Briesch, A. M., & Chafouleas, S. M. (2009). Children's Usage Rating Profile (Actual). Storrs, CT: University of Connecticut.

Briesch, A. M., & Chafouleas, S. M. (2009). Exploring student buy-in: Initial development of an instrument to measure likelihood of children's intervention

usage. *Journal of Educational & Psychological Consultation, 19(4),* 321–336. https://doi-org.lynx.lib.usm.edu/10.1080/10474410903408885

Chafouleas, S. M., Briesch, A. M., Neugebauer, S. R., & Riley-Tillman, T. C. (2011). Usage Rating Profile – Intervention (Revised). Storrs, CT: University of Connecticut.

Jenson, W. R., Bowen, J., Clark, E., Block, H. M., Gabrielsen, T., Hood, J. A., Springer, B. (2011). Superheroes Social Skills. Eugene, OR: Pacific Northwest.

Malott, R. W., & Trojan-Suarez, E. A. (2004). Principles of behavior (5th ed.). Upper Saddle River, NJ: Prentice-Hall.

Matson, J. L., Benavidez, D. A., Compton, L. S., Paclawskyj, T., & Baglio, C. (1996). Behavioral treatment of autistic persons: A review of research from 1980 to the present. *Research in Developmental Disabilities*, *17*(6), 433–465. https://doi.org/10.1016/S0891-4222(96)00030-3

O'Handley, R.D., Ford, W.B., Radley, K.C., Helbig, K.A., & Wimberly, J.K. (2016). Social skills training for adolescents with intellectual disabilities: a school-based evaluation. *Behavior Modification, 40 (4),* 541 – 567. http://journals.sagepub.com/doi/abs/10.1177/0145445516629938

Radley, K.C., Dart, E.H., Furlow, C.M., & Ness, E.J. (2014). Peer-mediated discrete trial training within a school setting. *Research in Autism Spectrum Disorder*, *9*, 53-67. http://doi.org/10.1016/j.rasd.2014.10.001

Radley, K.C., Ford, W.B., Battaglia, A.A., & McHugh, M.B. (2014). The effects of a social skills training package on social engagement of children with autism spectrum disorders in a generalized recess setting. *Focus on Autism and other*

Developmental Disabilities, 29(4), 216-229. http://journals.sagepub.com/doi/abs/10.1177/1088357614525660

Radley, K.C., Hanglein, J., & Arak, M. (2016) School-based social skills training for preschool-age children with autism spectrum disorder. *Autism 20 (8),* 938 – 951. http://journals.sagepub.com/doi/abs/10.1177/1362361315617361

Radley, K. C., O'Handley, R. D., Ness, E. J., Ford, W. B., Battaglia, A. A., McHugh, M. B., & McLemore, C. E. (2014). Promoting social skill use and generalization in children with autism spectrum disorder. Research in Autism Spectrum Disorders, 8(6), 669–680. https://doi.org/10.1016/j.rasd.2014.03.012

Smith, T. (2001). Discrete Trial Training in the Treatment of Autism. Focus on Autism and Other Developmental Disabilities, 16(2), 86–92. https://doi.org/10.1177/108835760101600204

Tarlow, K. R. (2017). An improved rank correlation effect size statistic for single-case designs: Baseline Corrected Tau. *Behavior Modification, 41*(4), 427-467. http://dx.doi.org/10.1177/0145445516676750

Tarlow, K. R. (2016). Baseline Corrected Tau Calculator. Retrieved from http://www.ktarlow.com/stats/tau

Appendix

Appendix A: IRB Approval

THE UNIVERSITY OF
SOUTHERN MISSISSIPPI

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 18022203
PROJECT TITLE: Social Skills Training and Generalization of Skills in Children with Autism Spectrum Disorder
PROJECT TYPE: Honor's Thesis Project
RESEARCHER(S): Brittany Wright
COLLEGE/DIVISION: College of Education and Psychology
DEPARTMENT: Psychology
FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 03/02/2018 to 03/01/2019
Lawrence A. Hosman, Ph.D.
Institutional Review Board

Appendix B: IRB Modification Approval

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

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- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: CH18022203
PROJECT TITLE: Social Skills Training and Generalization of Skills in Children with Autism Spectrum Disorder (Addition/change in personnel and change in subject sample)
PROJECT TYPE: Change to a Previously Approved Project - Honor's Thesis
RESEARCHER(S): Brittany Wright
COLLEGE/DIVISION: College of Education and Psychology
DEPARTMENT: Psychology
FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 03/02/2018 to 03/01/2019
Lawrence A. Hosman, Ph.D.
Institutional Review Board

Appendix C: Parental Consent Form

ORI | Office of Research Integrity

INSTITUTIONAL REVIEW BOARD

PARENTAL CONSENT FORM

PARENTAL CONSENT PROCEDURES

This document must be completed by the Principal Investigator and signed by the parent or guardian of each potential research participant.

- The Project Information and Research Description sections of this form should be completed by the Principal Investigator before submitting this form for IRB approval.
- Signed copies of the long form consent should be provided to a parent or guardian of every participant.

Last Edited May 22nd, 2014

Today's date:

PROJECT INFORMATION

Project Title: Social Skills Training and Generalization of Skills in Children with Autism Spectrum Disorder		
Principal Investigator: Brittany Wright	Phone: 901-828-2013	Email: brittany.m.wright@usm.edu
College: The University of Southern Mississippi	Department: Psychology	

RESEARCH DESCRIPTION

1. **Purpose**:

We want to learn if previous research using the Superheroes Social Skills Training program in combination with lag schedules of reinforcement improves the accuracy and variability of social skills and if those skills can generalize across different settings and people. This mean we want to know if the students can use the skills they learn from the Superheroes Social Skills Training program outside of the training setting and with different people. The Superheroes Social Skills Training program has been found to increase in social competence in children with autism spectrum disorder (ASD) in the past. Lag schedules of reinforcement have been found to reduce repetitive behaviors in children with ASD. Although there is limited research on how effective lag schedules are in a generalized setting.

2. **Description of Study:**

This study will consist of 3 phases: baseline, intervention with the Superheroes Social Skills program, and intervention with lag schedules of reinforcement. The interventions will be evaluated in both a training and general setting. The baseline phase will be used to assess the social skill competence of the participants by asking the participants questions to determine their social skill ability before any intervention or training. The intervention with the Superheroes Social Skills Training Program phase will utilize the Superheroes Social Skills Training program. This program uses animated superheroes describing steps, video models, role playing of target skills, and a game that requires the skill use. Finally, the intervention with lag schedules of reinforcement phase will again utilize the Superheroes Social Skills Training program along with lag schedules. Lag schedules require the students to answer a single question with a different response each time the question is asked. For example, if the question is "How are you doing today?" and they answer the question with "Good." the next time they are asked "How are you today?" they would have to have a different answer such as "I'm fine, thank you." With the lag schedules the student will receive reinforcement if they respond to each probe in a different way each time. To generalize these skills the questions will be asked by other students and teachers after training.
The participants will be 3 individuals between the second and fifth grades with a special education

classification of autism spectrum disorder. Students will be referred by staff members of the Arc. The procedures will take place once a week for eight weeks with each training session lasting about 30-35 minutes.

3. **Benefits:**

Participation in the present study will benefit the students in a practical way. Students should have increased social competence and peer connectedness. There should be some improvement in the students' academic performance and student retention. Negative behavioral problems should also decrease.

4. **Risks:**

All physical, psychological, and social risks associated with the present study are considered minimal. The students will have their regular school day disrupted, but to minimize educational disruptions the study will be conducted during a recess or break period. If a student is not willing to participate, refuses to cooperate during session, or displays aggressive or distressed behavior during a session, the session will be terminated. Participants and/or parents may choose to leave the study at any time.

5. **Confidentiality:**

Participant data will be de-identified using a number coding system and will remain confidential for the duration of the study. The data will be stored in a locked filing cabinet in the co-investigator's office in Owings-McQuagge Hall at the University of Southern Mississippi.

6. **Alternative Procedures:**

There are no alternative procedures. If you do not wish for your child to participate or if the child themselves does not wish to participate then they do not have to. There will not be any penalties for not participating.

7. **Participant's Assurance:**

This project has been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations.

Any questions or concerns about rights as a research participant should be directed to the Manager of the IRB at 601-266-5997.Participation in this project is completely voluntary, and participants may withdraw from this study at any time without penalty, prejudice, or loss of benefits.

Any questions about the research should be directed to the Principal Investigator using the contact information provided in Project Information Section above.

PARENTAL CONSENT INFORMATION	
Participant's Name:	Participant's Age:
Parent or Guardian's Name:	
Person Soliciting Parental Consent:	

AGREEMENT TO ALLOW PARTICIPATION IN RESEARCH

Consent is hereby given to participate in this research project. All procedures and/or investigations to be followed and their purpose, including any experimental procedures, were explained. Information was given about all benefits, risks, inconveniences, or discomforts that might be expected.

The opportunity to ask questions regarding the research and procedures was given. Participation in the project is completely voluntary, and participants may withdraw at any time without penalty, prejudice, or loss of benefits. All personal information is strictly confidential, and no names will be disclosed. Any new information that develops during the project will be provided if that information may affect the willingness to continue participation in the project.

Questions concerning the research, at any time during or after the project, should be directed to the Principal Investigator with the contact information provided above. This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5116, Hattiesburg, MS 39406-0001, 601-266-5997.

Parent or Guardian of Research Participant	**Person Explaining the Study**
Date	**Date**

Appendix D: Data Sheets

	Conversation									
Date	Probe	Phase	Face the person: orient head and shoulders toward the person	Make eye contact w/in 5s and maintain for 3s	Say something about a topic	Listen to the other person's response: maintain eye contact and orientation	Make a relevant comment	Gen	Percentage Correct	IOA
	1									
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

	Responding to Questions									
Date	Probe	Phase	Face the person: orient head and shoulders toward the person	Make eye contact w/in 5s and maintain for 3s	Listen to the other person's question: maintain eye contact and orientation	Respond w/in 10s	Respond with appropriate answer	Generalization	Percentage Correct	IOA
	1									
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

	Body Basics									
Date	Probe	Phase	Face the person: orient head and shoulders toward the person	Make eye contact w/in 5s and maintain for 3s	Appropriate Voice (Volume)	Appropriate Expression (Matches Conversation)	Posture (Relaxed)	Generalization	Percentage Correct	IOA
	1									
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

Appendix E: Procedural Integrity Checklist

Treatment Integrity – ARC Summer 2018

PRIMARY: DATE: SKILL: PHASE: DAY

	Yes	No	N/A
1. Free Play			
2. Probe Baseline Skills			
3. Probe Maintenance Skills			
4. Review Daily Schedule and Group Rules			
5. Introduce Skill & Provide Rationale			
6. List Discrete Steps			
7. Distribute Power Charge Cards			
8. Play Fast Hands & Peer Model Video			
9. Inaccurate and Accurate skill demonstration			
10. Role Play with Participants to 100% Accuracy – Provide Power Charge			
11. Distribute Comic book			
12. Play Comic Video			
13. Play Social Game			
14. Free time & Collect Probes of Target Skill			
15. Draw from Scooter/Black Hole Cards			
16. Use Spinner & Distribute rewards			

IOA

	Yes	No	N/A
1. Free Play			
2. Probe Baseline Skills			
3. Probe Maintenance Skills			
4. Review Daily Schedule and Group Rules			
5. Introduce Skill & Provide Rationale			
6. List Discrete Steps			
7. Distribute Power Charge Cards			
8. Play Fast Hands & Peer Model Video			
9. Inaccurate and Accurate skill demonstration			
10. Role Play with Participants to 100% Accuracy – Provide Power Charge			
11. Distribute Comic book			
12. Play Comic Video			
13. Play Social Game			
14. Free time & Collect Probes of Target Skill			
15. Draw from Scooter/Black Hole Cards			
16. Use Spinner & Distribute rewards			

Integrity =
IOA Agreement

Appendix F: Prompts Table

Table 1. Prompts

Conversation	Responding to Questions	Body Basics
"Hey (participant name)"	"Hey (participant name) how was your day?"	"Hey (participant name) what is your favorite animal?"
		"Hey (participant name) what did you do for spring break?
		"Hey (participant name) what is your favorite movie?
		"Hey (participant name) did you do this weekend?

Note. Prompts were the same in both the training and generalization probes. For the training probes, the prompt was delivered by one of the researchers. For the generalization probes, the prompt was delivered by the lead after-school teacher from the Arc of Southeast Mississippi.

Appendix G: CURP

CURP - Actual

Directions: Think about the method that your teacher or other adult has used with you. After reading each sentence, circle the number that matches your belief about it. For example, if the sentence was "I like chocolate ice cream," you might circle "4" for "I totally agree."

		I totally disagree	I kind of disagree	I kind of agree	I totally agree
1.	This was too much work for me.	1	2	3	4
2.	I understand why my teacher picked this method to help me.	1	2	3	4
3.	I could see myself using this method again.	1	2	3	4
4.	This is a good way to help students.	1	2	3	4
5.	It is clear what I had to do.	1	2	3	4
6.	I would not want to try this method again.	1	2	3	4
7.	This took too long to do.	1	2	3	4
8.	If my friend was having trouble, I would tell him/her to try this.	1	2	3	4
9.	I was able to do every step of this method.	1	2	3	4
10.	I felt like I had to use this method too often.	1	2	3	4

USAGE RATING PROFILE

		I totally disagree	I kind of disagree	I kind of agree	I totally agree
11.	Using this method gave me less free time.	1	2	3	4
12.	There are too many steps to remember.	1	2	3	4
13.	Using this method got in the way of doing other things.	1	2	3	4
14.	I understand why the problem needed to be fixed.	1	2	3	4
15.	This method focused too much attention on me.	1	2	3	4
16.	I was excited to try this method.	1	2	3	4
17.	This method made it hard for the other students to work.	1	2	3	4
18.	I would volunteer to use this method again.	1	2	3	4
19.	It is clear what the adult needed to do.	1	2	3	4
20.	I was able to use this method correctly.	1	2	3	4
21.	I liked this method.	1	2	3	4

USAGE RATING PROFILE

Appendix H: URP

URP-Intervention

Directions: Consider the described intervention when answering the following statements. Circle the number that best reflects your agreement with the statement, using the scale provided below.

		Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1.	This intervention is an effective choice for addressing a variety of problems.	1	2	3	4	5	6
2.	I would need additional resources to carry out this intervention.	1	2	3	4	5	6
3.	I would be able to allocate my time to implement this intervention.	1	2	3	4	5	6
4.	I understand how to use this intervention.	1	2	3	4	5	6
5.	A positive home-school relationship is needed to implement this intervention.	1	2	3	4	5	6
6.	I am knowledgeable about the intervention procedures.	1	2	3	4	5	6
7.	The intervention is a fair way to handle the child's behavior problem.	1	2	3	4	5	6
8.	The total time required to implement the intervention procedures would be manageable.	1	2	3	4	5	6
9.	I would not be interested in implementing this intervention.	1	2	3	4	5	6
10.	My administrator would be supportive of my use of this intervention.	1	2	3	4	5	6
11.	I would have positive attitudes about implementing this intervention.	1	2	3	4	5	6
12.	This intervention is a good way to handle the child's behavior problem.	1	2	3	4	5	6
13.	Preparation of materials needed for this intervention would be minimal.	1	2	3	4	5	6

USAGE RATING PROFILE

		Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
14.	Use of this intervention would be consistent with the mission of my school.	1	2	3	4	5	6
15.	Parental collaboration is required in order to use this intervention.	1	2	3	4	5	6
16.	Implementation of this intervention is well matched to what is expected in my job.	1	2	3	4	5	6
17.	Material resources needed for this intervention are reasonable.	1	2	3	4	5	6
18.	I would implement this intervention with a good deal of enthusiasm.	1	2	3	4	5	6
19.	This intervention is too complex to carry out accurately.	1	2	3	4	5	6
20.	These intervention procedures are consistent with the way things are done in my system.	1	2	3	4	5	6
21.	This intervention would not be disruptive to other students.	1	2	3	4	5	6
22.	I would be committed to carrying out this intervention.	1	2	3	4	5	6
23.	The intervention procedures easily fit in with my current practices.	1	2	3	4	5	6
24.	I would need consultative support to implement this intervention.	1	2	3	4	5	6
25.	I understand the procedures of this intervention.	1	2	3	4	5	6
26.	My work environment is conducive to implementation of an intervention like this one.	1	2	3	4	5	6
27.	The amount of time required for record keeping would be reasonable.	1	2	3	4	5	6
28.	Regular home-school communication is needed to implement intervention procedures.	1	2	3	4	5	6
29.	I would require additional professional development in order to implement this intervention.	1	2	3	4	5	6

USAGE RATING PROFILE

Appendix I: Skill Accuracy Figures

Figure 1. Skill Accuracy, Jill

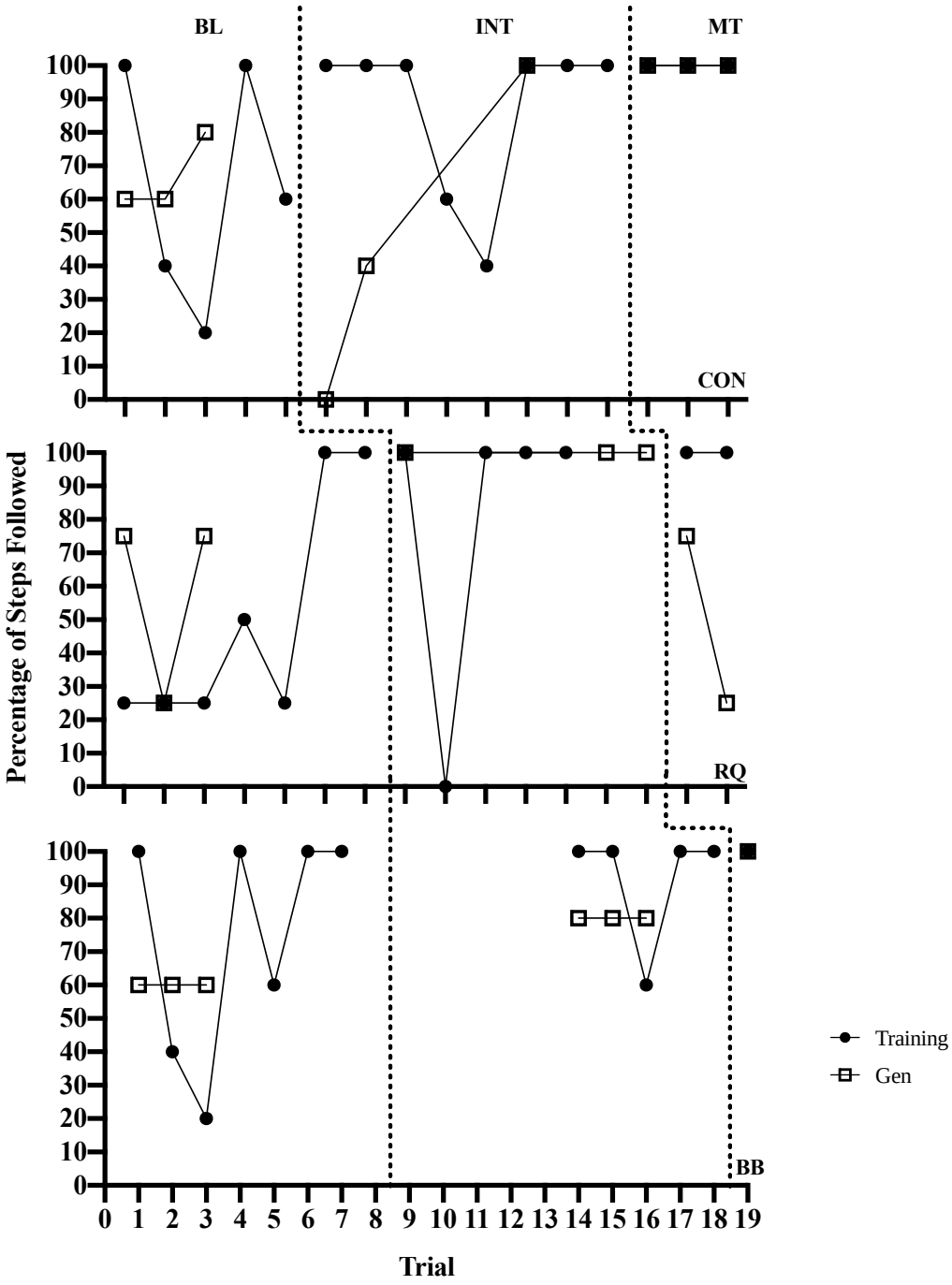


Figure 2. Skill Accuracy, Jake

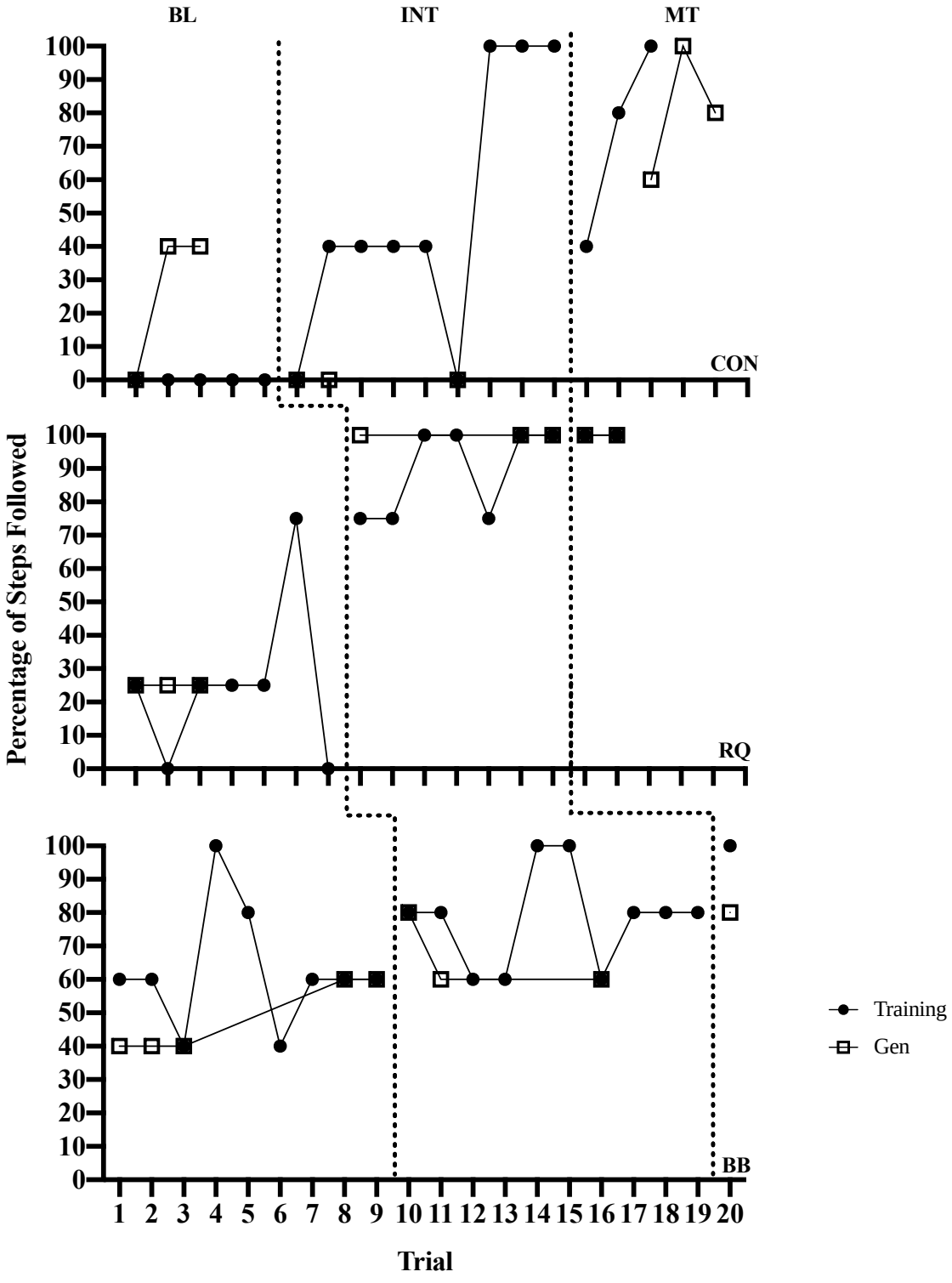
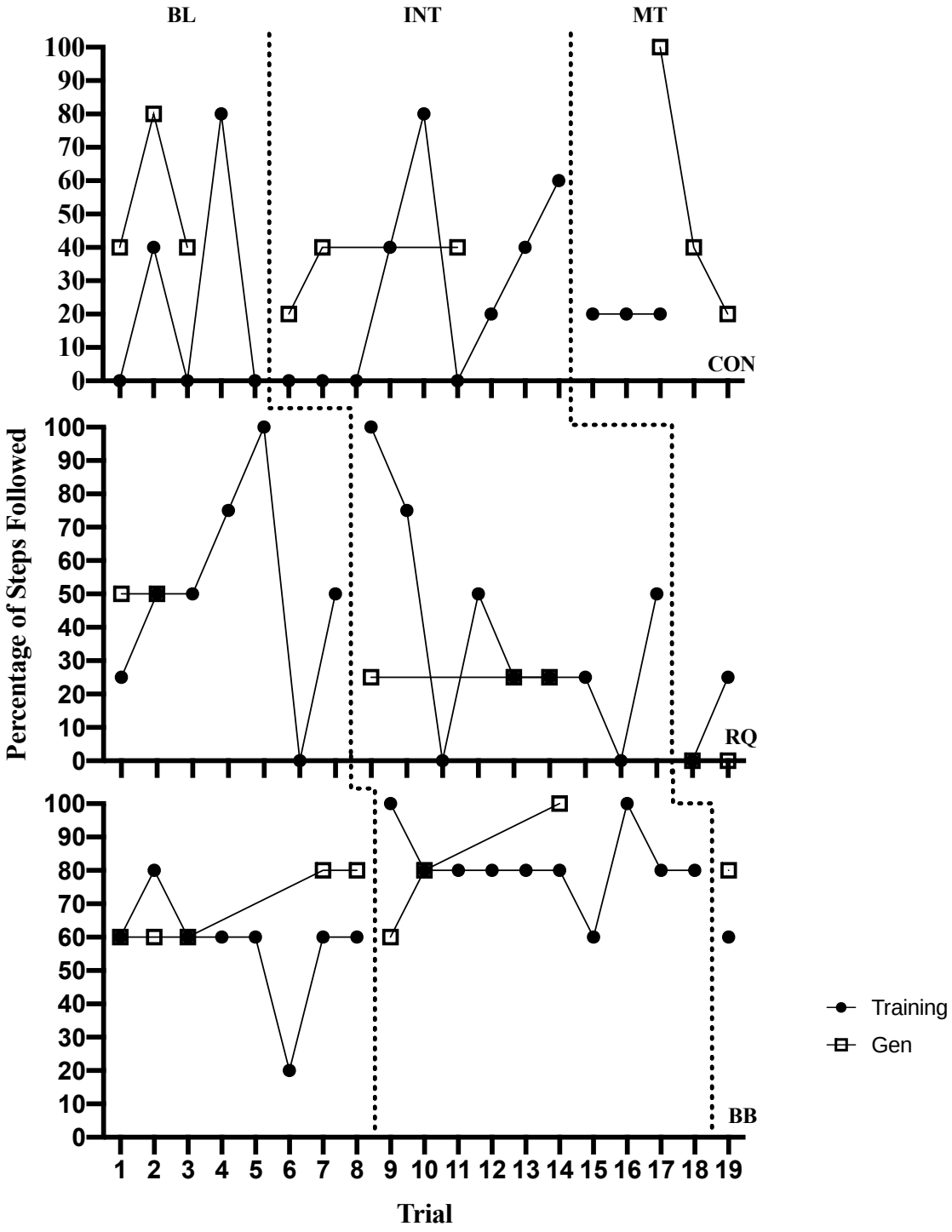


Figure 3, Skill Accuracy, Tom



Appendix J: Effect Sizes Tables

Table 2. BCT Scores Comparing Baseline to Training and Baseline to Maintenance for Training Probes

	Jill	Jake	Tom
Conversation-Training	0.595	**0.668**	0.073
Conversation- Maintenance	**0.732**	**0.913**	0.165
Responding to Question- Training	-0.537	**0.774**	-0.454
Responding to Question- Maintenance	-0.298	**0.707**	-0.542
Body Basics- Training	0.278	0.435	**0.716**
Body Basics- Maintenance	0.267	0.464	0.000

Note. BCT scores between 0.20 and 0.60 are considered moderate, scores between 0.60 and 0.80 are considered large, and scores over 0.80 are considered very large effects (Vannest & Ninci, 2015). Large and very large positive effects are in bold. BCT = baseline corrected tau.

Table 3. BCT Scores Comparing Baseline to Training and Baseline to Maintenance for Generalization Probes			
	Jill	Jake	Tom
Conversation-Training	**0.740**	-0.802	-0.556
Conversation- Maintenance	-0.087	-0.201	-0.201
Responding to Question- Training	**0.905**	**1.000**	-1.000
Responding to Question-Maintenance	-0.167	**1.000**	-1.000
Body Basics- Training	-0.740	-0.244	-0.439
Body Basics- Maintenance	**0.775**	0.577	-0.346
Note. BCT scores between 0.20 and 0.60 are considered moderate, scores between 0.60 and 0.80 are considered large, and scores over 0.80 are considered very large effects (Vannest & Ninci, 2015). Large and very large positive effects are in bold. BCT = baseline corrected tau.			

Appendix K: Social Functioning

Table 4. Pre- and Post-Intervention ASSP Scores						
	Jill		Jake		Tom	
	Pre	Post	Pre	Post	Pre	Post
Total	103	101	132	176	91	90
Reciprocity	49	52	57	92	34	34
Participation/Avoidance	17	16	34	41	13	14
Detrimental	30	24	32	34	32	30

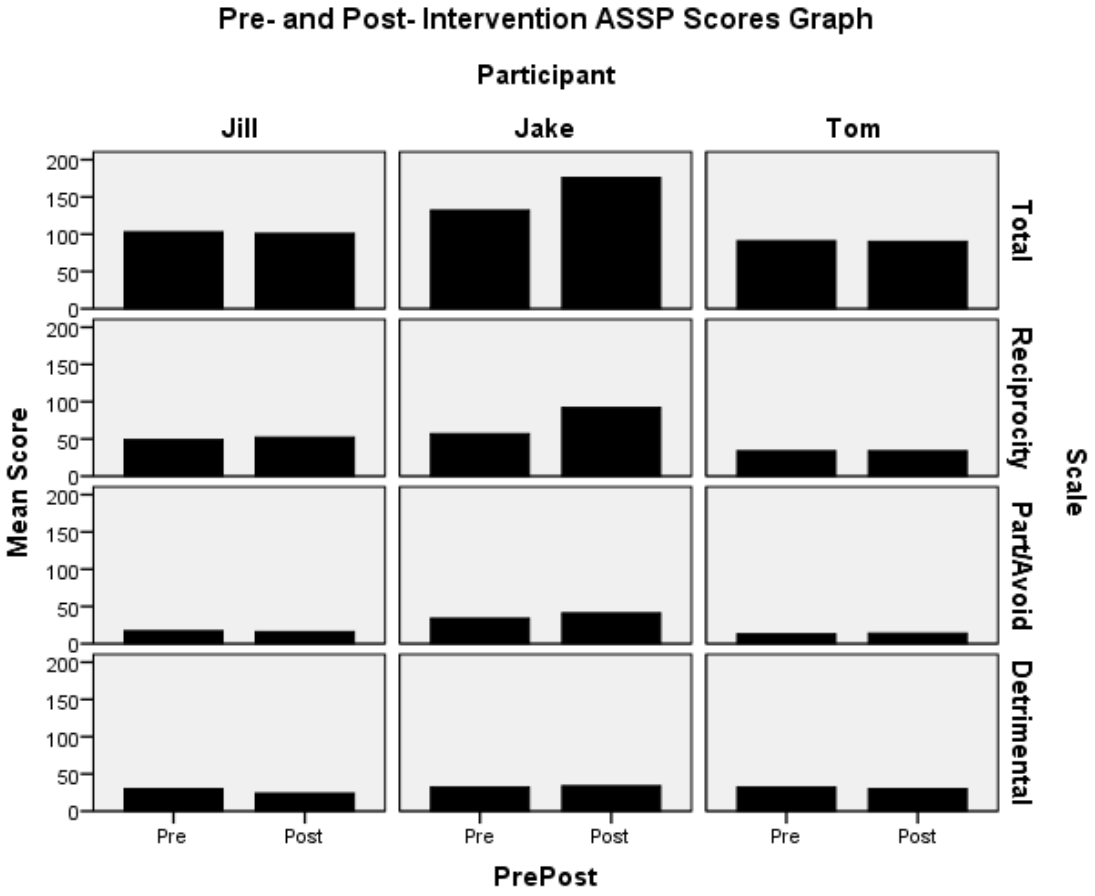


Figure 4. Pre- and Post- Intervention ASSP Scores Graph

Appendix L: Social Validity Tables

Table 5. CURP Scores		
FACTOR	Jill	Jake
Personal Desirability	22	21
Feasibility	12	15
Understanding	22	23
Mean Score	2.667	2.810

Table 6. URP Scores	
FACTOR	SCORE
Acceptability	46
Understanding	14
Family-School Collaboration	18
Feasibility	27
System Climate	25
System Support	10
Mean Score	4.83